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**Infusion bag, in particular for tea, label for an infusion bag and method for
attaching a label to the thread of an infusion bag**

The invention relates to an infusion bag, in particular for tea, at the head region of which a thread with label, which serves for handling and/or information, is attached. The invention also relates to a label for an infusion bag as well as a method for attaching a label to the thread of an infusion bag.

It is known to seal infusion bags exclusively by a thread. For this purpose, first the corners in the head region of the infusion bag are folded over and thereafter the centre part is folded over the folded corners, so that a reliable sealing of the infusion bag is obtained. This sealing is secured by a thread, which can be attached in several ways.

In a known embodiment according to the German Registered Utility Model 296 13 448 the thread applied to the head region of the infusion bag is attached by means of a separate attachment thread. Accordingly, the thread is attached to the label serving for handling and/or information by means of a separate attachment thread. This connection of the respective thread end to the infusion bag respectively the label does not resist to higher strains and requires a high processing effort.

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In order to create a more simple thread attachment, it is known from EP 0 807 579 to provide the folded head region with two recesses and to place the infusion bag beside a tensed thread, such that this one runs at the height of the recesses and through each of the recesses a tuck needle can be passed, which receive the thread and pull its two ends through the recesses. The free ends of the thread passed through the recesses of the infusion bag are attached to the label, for instance by means of welding or tacking. Herein it is disadvantageous that the attachment is loose and thus insecure and it is possible that the folded areas of the head region unfold, so that the contents of the infusion bag can fall out or a loss of flavour and freshness can occur.

From EP 0 691 268 a thread sealing is furthermore known, in which a needle is passed through a single hole in the head region of the infusion bag, which needle takes up a thread placed behind it and pulls it back through the aperture while forming a loop, which is then used for making a knot. Herein it is disadvantageous that it is not granted, that the folded corners and the centre part of the head region folded there over are taken commonly and with the bag by the thread connection and are connected by the formed knot. Even with high production precision in folding, punching and passing the thread, the sealing is not sufficiently safe.

In view of this state of the art it is the object of the invention to secure a safe fixation of the label to the thread by a thread connection, which can be established with low technical effort at a high production speed.

This object is achieved at an infusion bag of the initially mentioned type in that the thread having its free thread end placed on the one side of the label is pulled in a loop through the label and the loop is introduced from the other side into two slits in the marginal region of the label, such that its closed portion is placed on the one side of the label, the loop being tightened by pulling the thread.

The attachment of the label to the free end of the thread is carried out in a simple manner and can be realized in particular in a continuously working process with steady machine running and high piece numbers. Due to the friction forces the knot is not loosened, even under low prestress, i.e. loose tightening.

The invention also provides a label for an infusion bag, which label is attached to the thread end by a loop, which is formed by the free thread end, pulled through the label from one side and introduced in two slits in the marginal region of the label from the other side of the label, such that the closed portion of the loop is placed on the one side of the label and the loop is tightened by pulling the thread.

According to the method and for achieving the object, the thread having its free thread end placed on the one side of the label is taken by a needle penetrating the label and is pulled in a loop through the label. Afterwards, the loop is introduced from the other side in two slits in the marginal region of the label, such that its closed portion is again placed on the one side of the label. Thereafter, the loop is tightened by pulling the thread.

The invention provides a method working with simple technical devices and high working speed for attaching a label to the free end of a thread, the other end of which is attached to an infusion bag, the method being explained in the following by reference to the drawings by means of an exemplary embodiment. In the drawing:

- Fig. 1a is a perspective view of an infusion bag having folded corners and a centre part folded there over as well as a thread sealing;
- Fig. 1b shows the infusion bag of Fig. 1a with an enlarged representation of the thread sealing;
- Fig. 1c shows the infusion bag of Fig. 1a and 1b in the non-finished state without thread sealing;
- Fig. 1d is a schematic perspective view of an infusion bag with a label attached according to the invention;
- Figs. 2a and 2b show a side view and a plan view of an infusion bag placed into a holding device and a thread formed into a loop;

- Figs. 3a and 3b show a side view and a plan view, in which the needles have penetrated the infusion bag;
- Figs. 4a and 4b show another side view and a plan view, in which the needles have been withdrawn;
- Figs. 5a and 5b show a side view and a plan view of the bag sealed by the thread;
- Figs. 6a and 6b show a side view and a plan view of a label and the other thread end;
- Figs. 7a and 7b show a corresponding side view and plan view after the thread end has been pulled through;
- Figs. 8a and 8b show a further side view and plan view, in which the thread loop has been introduced in incisions of the label; and
- Figs. 9a and 9b show a side view and plan view of the thread attached to the label.

The infusion bag 1 represented in figs. 1a through 1c is first sealed according to fig. 1c by folding the corners 1a and 1b at the head region 6 and then folding the centre part 1c over them, such that the substrate contained in the interior of the chamber, in particular tea, cannot exit. Thereafter, infusion bag 1 is provided with a thread sealing 7 according to figs. 2a through 9a, the construction of which is in particular shown in fig. 1b. For forming thread sealing 7, two holes 8 and 9, which are placed side by side with lateral distance on the left and right side of the longitudinal axis of the bag, are formed in head region 6, which respectively penetrate one folded corner 1a or 1b and centre part 1c of head region 6. In order to enable this, four recesses in total are provided in head region 6 of infusion bag 1, according to fig. 1c, with centre part 1c not yet being folded, which recesses correspond with each other in form of a pair after folding centre part 1c and form equiaxed penetrating holes 8 and 9.

Thread sealing 7 also comprises a thread 3, which is passed with its one end 3b through hole 9 under formation of a loop 3a and with its other end 3c through the

second hole 8, wherein loop 3a is placed on the front side, as seen in the drawing, of bag 1 and ends 3b and 3c are placed on the back side, as seen in the drawing, of bag 1. The loop is passed over the head edge 10 of infusion bag 1 and both ends 3b and 3c of thread 3 are passed from below through loop 3a. By pulling one or both ends of the thread a double-secured knot 11 is formed, which fixes the corners 1a and 1b as well as centre part 1c of head region 6 in sealing position to each other and to the infusion bag.

From the drawing it can also be seen, that loop 3a is formed by crosswise superposed thread portions, wherein the short thread end 3b of the crosswise superposed thread portions of the loop is placed below the long thread end 3c adjacent to the bag wall.

As it is shown by fig. 1d, a label 5 is attached to the free end 3e of thread 3, wherein thread 3 having its free thread end 3e placed on one side of label 5 is taken by a needle penetrating label 5 and pulled in a loop 3f through label 5, then loop 3f is introduced from the other side in two slits 5a in the marginal region of label 5, such that its closed portion is again placed on the one side of label 5, and wherein afterwards the loop is tightened by pulling thread 3.

For providing the described sealing, infusion bag 1 is placed with its closed head region 6 in a recess 2a of a holding device 2, as shown by figs. 2a and 2b. Before, a thread 3 in form of a loop 3a was placed over recess 2a of holding device 2, as it is best shown by fig. 2b. Herein, the free end 3b of loop 3a is placed together with the continuous portion 3c of thread 3 on the one side of recess 2a, whereas the closed portion of loop 3a rests upon holding device 2 on the other side of recess 2a.

As it can be best seen from fig. 2a, loop 3a is pressed through the head edge of infusion bag 1 into recess 2a, so that it surrounds the head edge.

According to figs 3a and 3b, two needles 4, which are drawn in figs. 2a and 2b in the starting position, penetrate into the head region of the infusion bag below loop 3a. With their barb 4a formed on the bottom side (see fig. 2a) they take free end 3b, on the one hand, and continuous portion 3c of thread 3, on the other hand, as shown by figs. 3a and 3b.

When the needles 4 are now withdrawn to the starting position, as shown by figs. 4a and 4b, they entrain free end 3b, on the one hand, and a part of continuous portion 3c of thread 3, on the other hand, as shown by figs. 4a and 4b. While free end 3b is completely pulled out of the head region of infusion bag 1, a loop 3d has been formed in the continuous portion 3c of the thread due to the withdrawal of the corresponding needle 4, which loop is placed below the centre part of loop 3a. This situation is clearly represented in fig. 4b.

For now obtaining the complete enclosure of the head region of infusion bag 1 by the ends of thread 3, which is shown in figs. 5a and 5b, it is still necessary, to pull the continuous portion 3c, namely the long thread end of thread 3, completely out of infusion bag 1. This is for instance done by further transport of infusion bag 1, such that the remaining part of continuous portion 3c of thread 3 is completely pulled through loop 3a. By applying a certain tensile force to the continuous portion 3c of thread 3, the loop is finally tightened, so that the situation represented in Figs. 5a and 5b results.

For attaching a label 5, represented in figs. 6a through 9a, to the other end of thread 3, this latter one is placed with its end 3e close to a side of label 5, as shown in figs. 6a and 6b. Label 5 is penetrated preferably by a needle, which is in turn provided with barbs, and thread 3 is taken at its thread end 3e. According to Figs. 7a and 7b, thread end 3e is pulled through label 5 in form of a loop 3f.

This loop 3f is now taken and introduced into slits 5a, as shown by figs. 8a and 8b, which are formed in the marginal region of the label. The closed portion of loop 3f is thus again placed on the same side of label 5, on which thread end 3e and the continuous portion of thread 3 are placed. This situation is best shown in Fig. 9a.

By applying tension to thread 3, the loop around label 5 is finally tightened, so that the situation represented in fig. 9b results.

As it appears from the preceding disclosures of both the sealing of the head region of infusion bag 1 and the attachment of a label 5 to both ends of a thread 3, in both cases a loop enclosure of infusion bag 1 or label 5 is obtained, the adherence of thread 3

being sufficient for obtaining a reliable sealing of infusion bag 1 respectively a reliable attachment of label 5.

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Reference list

- 1 infusion bag
- 1a comer
- 1b comer
- 1c centre part
- 2 holding device
- 2a recess
- 3 thread
- 3a loop
- 3b free end
- 3c continuous portion
- 3d loop
- 3e thread end
- 3f loop
- 4 needle
- 4a barb
- 5 label
- 5a slit
- 6 head region
- 7 thread sealing
- 8 hole
- 9 hole
- 10 head edge
- 11 knot